Kramer Electronics, Ltd.

USER MANUAL

Models:

TP-125, ***UXGA / Audio / Data Line Transmitter***

TP-126, ***UXGA / Audio / Data Line Receiver***

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer TOOLS **TP-125**, *UXGA / Audio / Data Line Transmitter*, and/or **TP-126**, *UXGA / Audio / Data Line Receiver*, which are ideal for:

- Presentation and multimedia applications
- Long range graphics distribution for schools, hospitals, security, and stores

Each package includes the following items:

- **TP-125 or TP-126**
- Power adapter (12V DC Input)
- This user manual[2]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high-performance high-resolution cables[3]

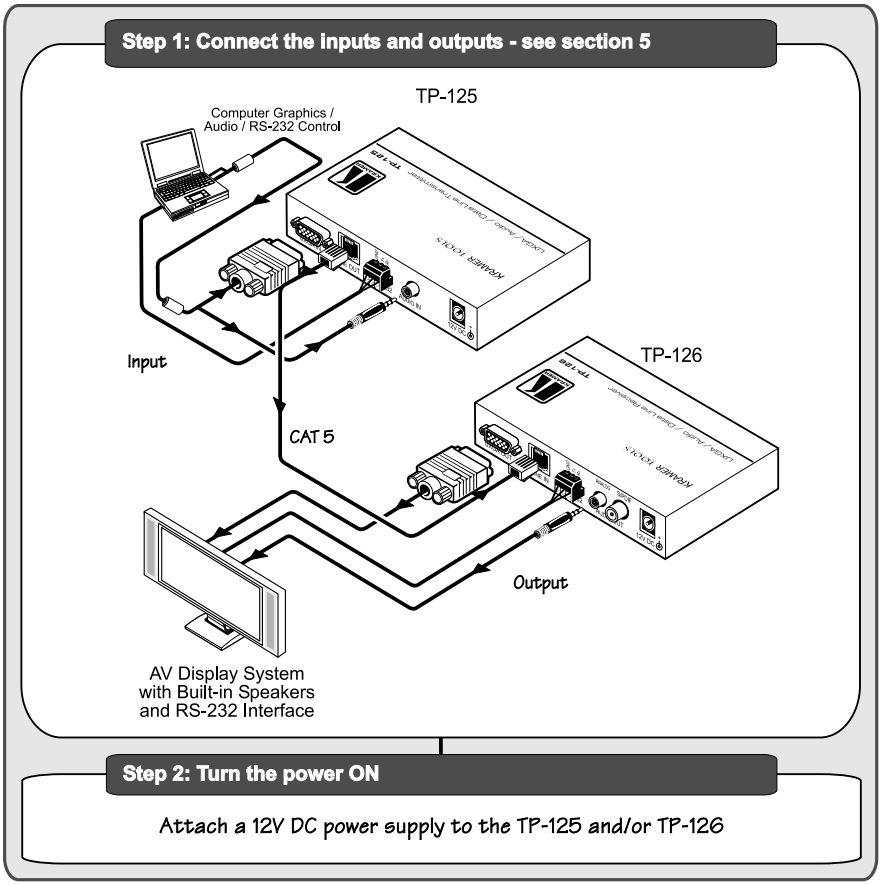
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Twisted-Pair Solutions; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

3 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.


Step 1: Connect the inputs and outputs - see section 5
TP-125
Computer Graphics / Audio / RS-232 Control
Input
CAT 5
TP-126
Output
AV Display System with Built-in Speakers and RS-232 Interface
Step 2: Turn the power ON
Attach a 12V DC power supply to the TP-125 and/or TP-126

3 Overview

The **TP-125** and **TP-126** are a high-performance twisted pair transmitter and receiver for computer graphics video (including HDTV), unbalanced stereo audio, and RS-232 control commands.

The **TP-125** converts computer graphics video, unbalanced stereo analog audio, and RS-232 control commands to a twisted pair signal, and the **TP-126** converts the twisted pair signal back into computer graphics video, unbalanced stereo and S/PDIF digital audio, and RS-232 control signals. Together the **TP-125** and **TP-126** form a computer graphics/audio line transmitter/receiver system.

More specifically, the products feature:

- High bandwidth of 350MHz (-3dB)
- Resolution up to UXGA
- HDTV compatibility
- Simultaneous unbalanced stereo and S/PDIF (24-bit 48kHz) audio outputs (**TP-126**)
- Level (gain) and EQ (peaking) controls (**TP-126**)
- System range up to 100m (300ft)
- Power Connect™ System - Only one unit in a system, the transmitter or the receiver, needs to be connected to a power source when the devices are within 50m (150ft) of each other

This user manual describes the following Kramer TOOLS:

- **TP-125** *UXGA / Audio / Data Line Transmitter*, see section 4.1
- **TP-126** *UXGA / Audio / Data Line Receiver*, see section 4.2

This section describes:

- The power connect feature, see section 3.1
- Using shielded twisted pair (STP) / unshielded twisted pair (UTP), see section 3.2
- Recommendations for achieving the best performance, see section 3.3

3.1 About the Power Connect Feature

The Power Connect feature applies as long as the cable can carry power. The distance does not exceed 50 meters on standard CAT 5 cable, for longer distances, heavy gauge cable should be used[1].

For a CAT 5 cable exceeding a distance of 50 meters, separate power supplies should be connected to the transmitter and to the receiver simultaneously.

3.2 Shielded Twisted Pair (STP) / Unshielded Twisted Pair (UTP)

The decision whether to use shielded twisted pair (STP) cable or unshielded twisted pair (UTP) cable depends on the nature of the application.

In applications with high interference, shielded twisted pair (STP) cable is recommended. However, the cable shield creates a capacitance that degrades the frequency response of the device. For distances of 50 meters or less shielded twisted pair (STP) cable is preferred because it provides interference protection without any apparent degradation.

In applications where either: 1) the source and transmitter or receiver and destination monitor are disconnected from common ground, or 2) the source area (building) and destination area have no common ground – STP cable is preferred. For long-range applications, unshielded twisted pair (UTP) cable is preferred. However, unshielded twisted pair (UTP) cable should be installed far away from sources of electromagnetic interference such as electric cables and motors.

It is recommended to use shielded twisted pair (STP) skew-free Kramer cable **BC-SXTP** for transmitting VGA signals, and shielded twisted pair (STP) non-skew-free Kramer **BC-STP** cable for digital signals.

3.3 Recommendations for Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables[2] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low-quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **TP-125/TP-126** away from moisture, excessive sunlight and dust

1 CAT 5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

2 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

Caution – No operator-serviceable parts inside unit.

Warning – Use only the Kramer Electronics input power wall adapter that is provided with this unit[1].

Warning – Disconnect power and unplug unit from wall before installing or removing device or servicing unit.

4 Your TP-125 / TP-126

This section defines the:

- **TP-125**, *UXGA / Audio / Data Line Transmitter* (see section 4.1)
- **TP-126**, *UXGA / Audio / Data Line Receiver* (see section 4.2)

4.1 Your TP-125 UXGA / Audio / Data Line Transmitter

The **TP-125** is a high-performance transmitter that accepts:

- A computer graphics input signal
- An unbalanced stereo analog audio signal
- RS-232 control commands

The **TP-125** codes the signals and transmits them over CAT 5 cable to a **TP-126** receiver.

The stereo analog audio signal is converted to the digital audio (S/PDIF) stream before transmitting, thus preserving the quality of the audio source signals.

Commands and data can flow in both directions via the RS-232 interface, allowing status requests and control of the destination unit.

Figure 1 and *Table 1* define the **TP-125**:

1 For example: model number AD2512C, part number 2535-000251

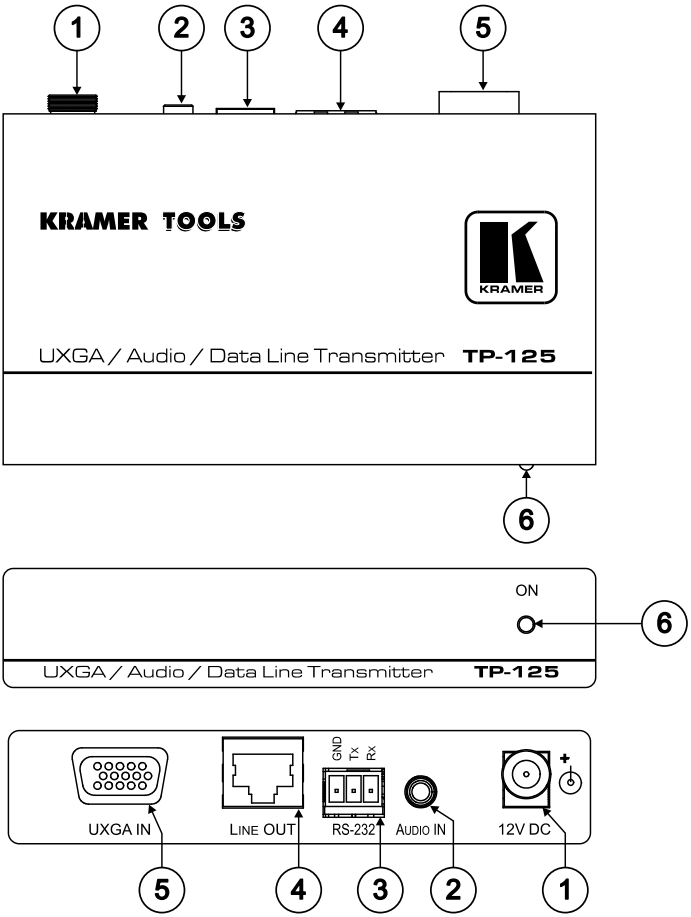


Figure 1: TP-125 UXGA / Audio / Data Line Transmitter

Table 1: TP-125 UXGA / Audio / Data Line Transmitter Features

#	Feature	Function
1	*12V DC*	+12V DC connector for powering the unit
2	*AUDIO IN* 3.5mm Mini Jack	Connects to the audio source
3	*RS-232* Terminal Block Connector	Connects to the PC or the Remote Controller (see section 5.1)
4	*LINE OUT* RJ-45 Connector	Connects to the LINE IN RJ-45 connector on the **TP-126** *UXGA / Audio Line Receiver*
5	*UXGA IN* 15-pin HD (F) Connector	Connect to the UXGA source
6	*ON* LED	Illuminates when receiving power

4.1.1 The TP-125 Internal Polarity Switches

Figure 2 and *Table 2* define the internal sync polarity switches inside the **TP-125**.

Note, that you need to open the **TP-125** unit to gain access to the Vs and Hs Polarity switches. After setting the switches, close the **TP-125** unit.

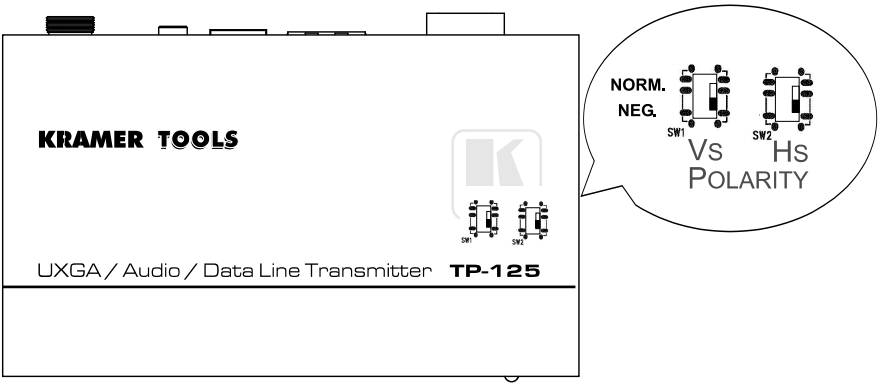


Figure 2: TP-125 Internal Polarity Switches

Table 2: Features of the TP-125 Internal Polarity Switches

Feature	Function
VS Switch	Slide down to set the V SYNC to negative polarity (NEG); slide up[1] to set the V SYNC to positive polarity (NORM)
HS Switch	Slide down to set the H SYNC to negative polarity (NEG); slide up[1] to set the H SYNC to positive polarity (NORM)

4.2 Your TP-126 UXGA / Audio / Data Line Receiver

The **TP-126** is a high-performance receiver obtaining the computer graphics signal/audio/control data from the Kramer **TP-125** via UTP cabling at its CAT 5 line input. The **TP-126** outputs a computer graphics signal, an unbalanced stereo analog audio signal, a converted digital audio (S/PDIF) signal, and bi-directional RS-232 control commands and data, to and from the receiver. The RS-232 interface makes it possible to control virtually any device over a transmission range of more than 300 feet (more than 100 meters) over UTP cabling.

1 By default, both switches are set down (for a negative V SYNC and H SYNC polarity)

In addition, the **TP-126** features:

- Level and EQ. control for the UXGA signals
- The capability to change the polarity of decoding H and V Sync
- 24 bit 48kHz S/PDIF digital audio that supplies the highest quality audio
- 12V DC power

Figure 3 and *Table 3* define the **TP-126** *UXGA / Audio / Data Line Receiver*:

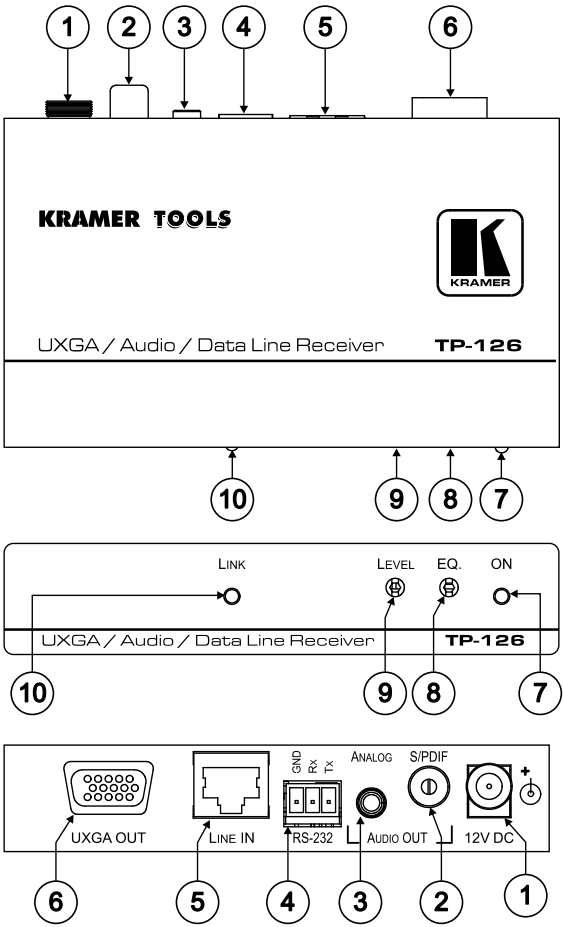


Figure 3: TP-126 UXGA / Audio / Data Line Receiver (Top, Front, and Rear)

Table 3: TP-126 UXGA / Audio / Data Line Receiver (Top, Front, and Rear) Features

#	Feature		Function
1	*12V DC*		+12V DC connector for powering the unit
2	AUDIO OUT	*S/PDIF* RCA connector	Connects to the digital audio acceptor
3	AUDIO OUT	*ANALOG* 3.5mm Mini Jack	Connects to the analog audio acceptor
4	*RS-232* Terminal Block Connector		Connects to the controlled unit
5	*LINE IN* RJ-45 Connector		Connects to[1] the *LINE OUT* RJ-45 connector on the **TP-125**
6	*UXGA OUT* 15-pin HD (F) Connector		Connects to the UXGA acceptor
7	*ON* LED		Illuminates when receiving power
8	*EQ.*[2] Trimmer		Adjusts the cable compensation equalization level
9	*LEVEL* Trimmer		Adjusts the output signal level
10	*LINK* LED		Illuminates when receiving the correct input signal

4.2.1 Your TP-126 UXGA / Audio / Data Line Receiver (Underside)

Figure 4 and *Table 4* define the underside of the **TP-126** *UXGA / Audio / Data Line Receiver*.

Note, that you need to open the **TP-126** unit to gain access to the Vs and Hs Polarity switches. After setting the switches, close the **TP-126** unit.

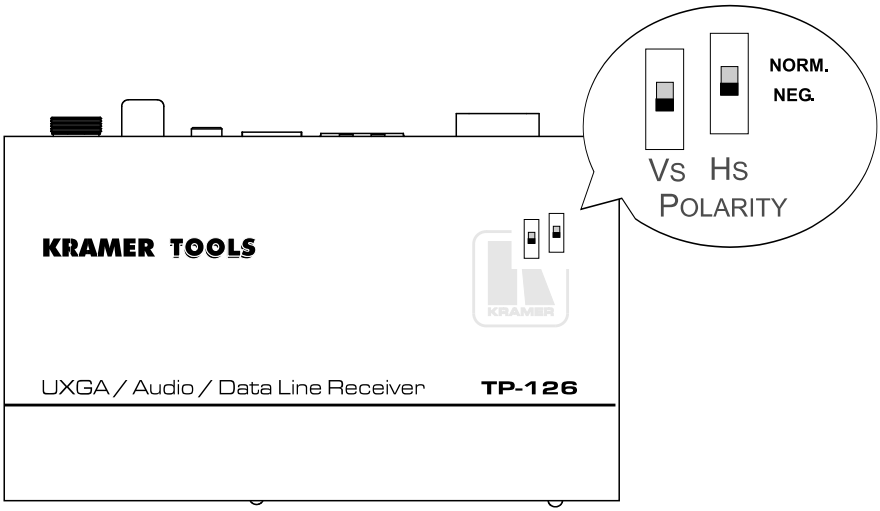


Figure 4: TP-126 UXGA / Audio / Data Line Receiver (Underside)

1 Using a UTP cable with CAT 5 connectors at both ends (the PINOUT is defined in *Figure 7* and *Table 6*)

2 Degradation and UXGA signal loss can result from using long cables (due to stray capacitance), sometimes leading to a total loss of sharpness in high-resolution signals

Table 4: TP-126 UXGA / Audio / Data Line Receiver (Underside) Features

#	Feature	Function
1	*VS* Switch	Slide down to set the V SYNC to negative polarity (NEG); slide up[1] to set the V SYNC to positive polarity (NORM)
2	*HS* Switch	Slide down to set the H SYNC to negative polarity (NEG); slide up[1] to set the H SYNC to positive polarity (NORM)

5 Connecting the TP-125/TP-126 Transmitter/Receiver Pair

You can use the **TP-125** *UXGA / Audio / Data Line Transmitter* and the **TP-126** *UXGA / Audio / Data Line Receiver* to configure a twisted pair transmitter and receiver system, to transmit the video, audio and RS-232 control signals via CAT 5 UTP cable.

To connect the **TP-125** and the **TP-126** to create a twisted pair transmitter and receiver system, as the example in *Figure 5* illustrates, do the following:

1. On the **TP-125**, connect:
   - An UXGA source (for example, the graphics card on a laptop) to the UXGA IN 15-pin HD (F) connector and an audio source to the Audio IN 3.5mm mini jack, for example, using a Kramer C-GMA/GMA cable (VGA 15-pin HD (M) +Audio jack to VGA 15-pin HD (M) +Audio jack)[2]
   - An RS-232 cable with a 9-pin D-sub connector at one end to the laptop, and a 3 PIN terminal block connector at the other end to the TP-125 RS-232 port[3]
2. On the **TP-126**, connect:
   - The UXGA OUT 15-pin HD (F) connector to the AV display system
   - The S/PDIF Audio OUT RCA connector to a digital AV Receiver (leave the ANALOG Audio OUT 3.5mm mini jack unconnected)
   - An RS-232 cable with a 3 PIN terminal block connector at one end to the **TP-126** RS-232 port[3], and a 9-PIN D-SUB connector at the other end to the RS-232 port on the AV display system

1 By default, both switches are set down (for a negative V SYNC and H SYNC polarity)

2 Not supplied. The full list of Kramer cables is on our Web site at http://www.kramerelectronics.com. Alternatively, you can connect an UXGA source to the UXGA IN 15-pin HD (F) connector, and a separate audio source to the AUDIO IN 3.5mm mini jack

3 As defined in *Figure 6* and *Table 5*

3. Connect the Line OUT RJ-45 connector on the **TP-125** to the LINE IN RJ-45 connector on the **TP-126,** via UTP cabling[1] (with a range of more than 300ft (>100m)).
4. Connect the 12V DC power supply to the power socket and connect the adapter to the mains electricity on either (or both[2]) the **TP-125** or the **TP-126**.
5. On the **TP-126**:
   - Adjust the video output signal level and/or cable compensation equalization level with a screwdriver, if required
   - If necessary, set the H SYNC and V SYNC switches[3], on the underside

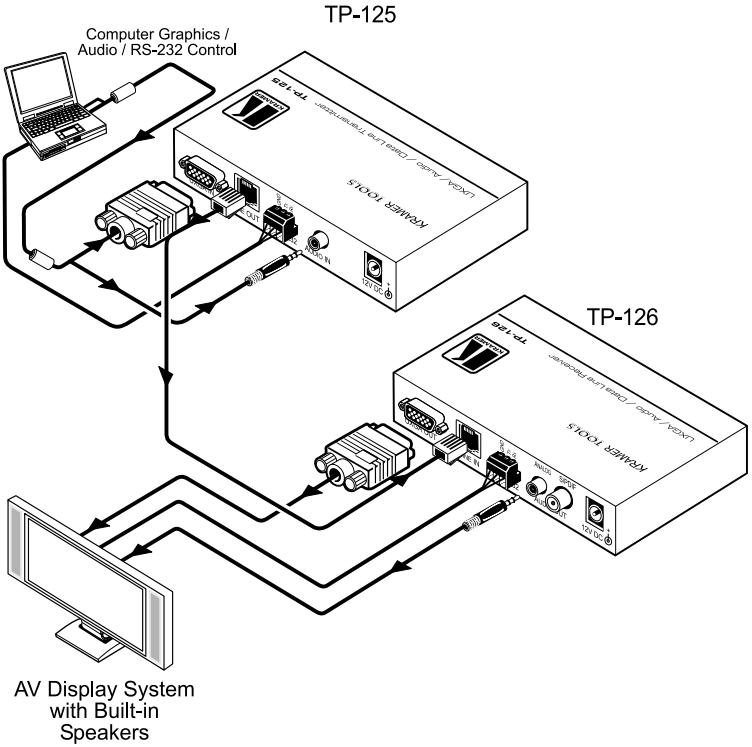


Figure 5: Connecting the UXGA / Audio / Data Line Transmitter / Receiver System

1 For details of how to wire a CAT 5LINE IN / LINE OUT RJ-45 connector, see section 5.2

2 See section 3.1

3 By default, both switches are set down (for negative V SYNC and H SYNC polarity)

5.1 Transmitting via RS-232 (for example, using a PC)

Prepare an RS-232 cable with a 9-pin D-sub connector at one end, and a 3 PIN terminal block connector at the other end, as defined in *Table 5* and *Figure 6*:

Table 5: RS-232 PINOUT Connection

Connect this PIN on the Terminal Block Connector:	To this PIN on the 9-pin D-sub Connector
TxD	PIN 2
RxD	PIN 3
GND	PIN 5

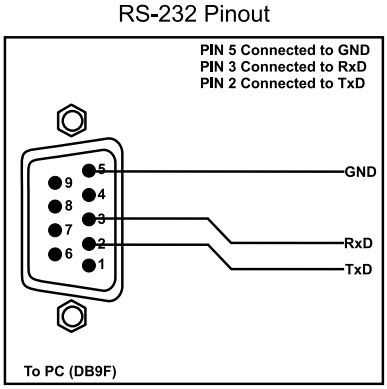


Figure 6: RS-232 PINOUT Connection

5.2 Wiring the CAT 5 RJ-45 Connectors

Table 6 and *Figure 7* define the CAT 5 pinout, using a straight pin-to-pin cable with RJ-45 connectors:

Table 6: CAT 5 Connector Pinout

EIA /TIA 568A	
PIN	Wire Color
1	Green / White
2	Green
3	Orange / White
4	Blue
5	Blue / White
6	Orange
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	3 and 6
Pair 3	1 and 2
Pair 4	7 and 8

EIA /TIA 568B	
PIN	Wire Color
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	1 and 2
Pair 3	3 and 6
Pair 4	7 and 8

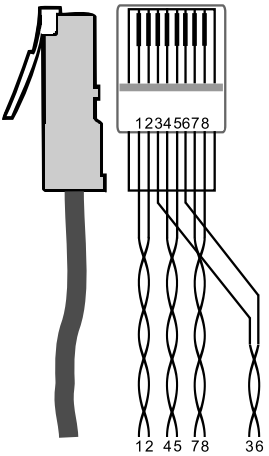


Figure 7: CAT 5 Connector

6 Technical Specifications

The **TP-125, TP-126** technical specifications are shown in *Table 7*:

Table 7: Technical Specifications of the TP-125 / TP-126

	TP-125	**TP-126**
INPUTS:	Video: 1 UXGA on an HD15 connector Audio: 1 audio ANALOG 3.5mm mini jack	1 RJ-45 LINE IN connector
OUTPUTS:	1 RJ-45 OUT connector	Video: 1 UXGA on an HD15 connector Audio: 1 audio S/PDIF RCA connector 1 audio ANALOG 3.5mm mini jack
MAX. OUTPUT LEVEL:		Video: 1.6V Audio: 2.3V
CONTROLS:	RS-232 3 PIN Terminal Block	RS-232 3 PIN Terminal Block Level: –7.5dB to +4.4dB, EQ.: 0dB to +33dBm (130m) @ 50MHz
RS-232 BAUD RATE:	Up to 19200kbps	
RS-232 MODE:	Full-duplex	
BANDWIDTH:	Audio: 20Hz – 20kHz@0.5dB	
S/N RATIO:	Audio: <–80dB	
TOTAL GAIN:	Audio: Analog/analog: 0dB Analog/SPDIF: –12dBFS	
COUPLING:	AC	
TND+N:	Audio: <0.01%	
POWER SOURCE:	12 VDC 60mA	
DIMENSIONS:	12.1cm x 7.18cm x 2.42cm (4.76" x 2.83" x 0.95"), W, D, H	
WEIGHT:	0.3 kg. (0.67 lbs.) approx.	
ACCESSORIES:	Power supply	

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: “Radio frequency devices Subpart B Unintentional radiators”

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000371 REV 3